Research Overview
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My research focuses on decision-making of firms under uncertainty and the equilibrium implications of these decisions. In various economic settings, I examine the effect of shocks to the firm’s, industry’s, or economy’s productivity on corporate policies and outcomes. I also study the broad economic implications of contracting frictions, which lead to interactions between real and financial decisions that manifest themselves in many different ways in corporate practice.

One unique aspect of my approach to research in corporate finance is, as a way to develop quantitative predictions, the use of (dynamic) structural models that can be calibrated to data. These considerations appear early on in my research agenda (since my Ph.D. dissertation at U.C. Berkeley) and are central to my current and future work. While this new class of models was not widely accepted by the profession at the time I conducted my dissertation research, (dynamic) structural models have overcome some of the remarkable shortcomings of traditional (static) models. In part also due to my research, this new class of models has since then been increasingly regarded as one of the state-of-the-art modeling approaches in both asset pricing and corporate finance.

To help organize ideas, I list my papers under well-defined topics, which are, however, largely integrated into my overall agenda, namely (dynamic) structural models. More specifically, I group my current, past, and future research activities into three distinct yet related areas: capital structure (which includes my work on interactions between corporate financing and investment decisions); boundaries of the firm and mergers and acquisitions; and intersection between asset pricing and corporate finance.

Overall, I believe that my areas of expertise have received a good deal of attention in the profession, and that my work in these areas is well-known. As a potential gauge for the impact of my research, I include at the end of this research statement a list of published works citing my articles, which appear 247 times in the reference sections of published works.

Capital Structure

Despite of the substantial development of the capital structure literature over several decades, little attention had been paid to the effects of macroeconomic conditions on credit risk and corporate financial policy prior to this study. The article titled “Capital Structure, Credit Risk, and Macroeconomic Conditions” (Journal of Financial Economics, 2006), co-authored with Jianjun Miao and Erwan Morellec, develops a tractable framework for analyzing the impact of macroeconomic conditions on bankruptcy probabilities, debt capacity, and financial policy. Empirical evidence indicates that debt levels are substantially lower than those predicted by prior models. Notably, the debt levels that our model generates are in line with the ones observed in corporate practice. Moreover, aggregate shocks generate time-series variation in the expected present value
of cash flows that may not only induce bankruptcy following a series of negative firm-level shocks (as in other structural models) but also subsequent to a single negative macroeconomic shock. Thus, incorporation of macroeconomic conditions into our structural model provides the basis for such pervasive phenomena as clustering of exit decisions observed in many industries and markets. Much empirical evidence also supports the view that leverage ratios, defined as debt value divided by firm value, are lower during booms than during recessions. Interestingly, we predict that leverage ratios are countercyclical in our model. We then examine dynamic capital structure choice and find that firms should adjust their debt levels more often and by smaller amounts in booms than in recessions. Finally, we demonstrate that our model’s term structure of credit spreads encompasses strictly positive risk premiums (i.e. spreads) even for short-term debt, which is a stylized fact hard to reconcile within other classes of models.

"Can the Tradeoff Theory Explain Debt Structure?" (Review of Financial Studies, 2007), co-authored with Christopher Hennessy and Hayne Leland, proposes a dynamic framework to assess the effectiveness of tradeoff theory in explaining stylized facts regarding debt structure. To abstract from existing rationales for the use of bank debt, the sole difference between market lenders and the bank is that only the latter is able to renegotiate. We find that the optimal mixture and priority structure of bank and market debt hinges upon the division of ex post bargaining power (i.e. weak or strong firm vis-a-vis the bank). Flexible bank debt offers a superior tradeoff between tax shields and bankruptcy costs, but ease of renegotiation limits bank debt capacity because banks that offer renegotiable contracts anticipate that the lending relationship may be plagued by ex post bargaining frictions. We contribute to the understanding of debt and priority structure in several important ways. Weak firms have high bank debt capacity and utilize bank debt exclusively. Strong firms lever up to their (lower) bank debt capacity, augment with market debt, and place the bank senior. Therefore, our (dynamic) tradeoff theory provides a number of predictions that are consistent with the empirical evidence. First, young/small firms tend to use bank debt exclusively. Second, large/mature firms typically employ mixed debt financing. Third, bank debt is senior compared to market debt. Moreover, we generate implications on cross-country variation in debt structure. In countries where the bankruptcy regime entails soft (tough) enforcement of contractual priority, bank debt capacity is low (high), implying more (less) reliance on market debt.

In the article titled “Managerial Traits and Capital Structure Decisions” (Journal of Financial and Quantitative Analysis, 2008), I study the financial policy implications of manager optimism and overconfidence within a dynamic model featuring a tax shield-bankruptcy cost tradeoff. I demonstrate that extending traditional tradeoff theory to account for these managerial traits can tighten some important gaps between known theoretical predictions and unresolved empirical facts. When for instance optimistic managers, who overestimate the growth rate of future earnings, access capital markets, they have a standard pecking order preference. However, overconfident managers surprisingly exhibit the opposite behavior. They underestimate the riskiness of future earnings and hence view debt also as undervalued by the capital market. The convexity of equity implies that they perceive their firms’ equity to be overvalued. Thus, overconfident managers prefer issuing equity over debt, which poses a challenge to the standard paradigm. That is, they have
a reverse pecking order preference. The model generates numerous other results and surprisingly uncovers that managerial traits can play a positive role. For example, biased managers’ higher debt levels restrain them from diverting funds. Hence managerial traits create value by reducing manager-shareholder conflicts that can arise when managers are loath to pay out cash.

I integrate a capital structure model into a real options framework of irreversible investment under uncertainty to analyze the effects of managerial optimism and overconfidence on the interaction between corporate financing and investment decisions in the article titled “Determinants of Corporate Borrowing: A Behavioral Perspective” (Journal of Corporate Finance, 2009). Several empirical implications follow from solving the model. Notably, my analysis reveals that managerial traits can ameliorate bondholder-shareholder conflicts, such as the debt overhang problem. While debt delays investment inefficiently, mildly biased managers can overcome this problem, even though they tend to issue more debt. That is, mildly biased managers make capital structure decisions that are more in the interest of shareholders, while extreme managerial biases are definitely detrimental to the interest of shareholders. Similar properties and results are discussed for other real options, such as the asset stripping or risk-shifting problems.

In the article titled “Optimal Priority Structure, Capital Structure, and Investment” (Review of Financial Studies, 2012), David Mauer and I consider a dynamic model where the firm has multiple debt issues and equityholders choose the timing of investment. Jointly optimal capital and priority structures can virtually eliminate investment distortions, because debt priority serves as a dynamically optimal contract. Examining the relative efficiency of priority rules observed in practice, we develop several predictions about how firms adjust their priority structure in response to changes in leverage, credit conditions, and firm fundamentals. Notably, large, financially unconstrained firms with few growth opportunities prefer senior debt, while small, financially constrained firms, with or without growth opportunities, prefer junior debt. Moreover, lower rated firms are predicted to spread priority across debt classes. Lastly, our analysis also has a number of important implications for empirical capital structure research, including the relations between market leverage, book leverage, and credit spreads and Tobin’s Q, the influence of firm fundamentals on the agency cost of debt, and the conservative debt policy puzzle.

Continuing my interest in dynamic models of corporate financing and investment, Murillo Campello and I formalize and test the idea that the credit multiplier of asset tangibility plays a central role in linking financing and investment. In our article titled “The Firm-Level Credit Multiplier” (Journal of Financial Intermediation, 2012), financially constrained firms benefit the most from investing in tangible assets because those assets help relax constraints, allowing for further investment. Using a dynamic model, we characterize this effect, which we call firm-level credit multiplier, and show how asset tangibility increases the sensitivity of investment to Tobin’s Q for financially constrained firms. Examining a large sample of manufacturers over the 1971–2005 period as well as simulated data, we find support for our theory’s tangibility–investment channel. We further verify that our findings are driven by firms’ debt issuance activities. Consistent with our empirical identification strategy, the firm-level credit multiplier is absent from samples of financially unconstrained firms and samples of financially constrained firms with low spare debt capacity.
The paper titled “Asymmetric Information and the Pecking (Dis)Order”, co-authored with Paolo Fulghieri and Diego Garcia, reconsiders the pecking order of external financing under asymmetric information. In a setting where firms have assets in place and a growth option, we show that equity financing can dominate debt financing when the only friction is asymmetric information between the firm’s owners and outside investors. We characterize the conditions under which equity is less informationally sensitive than debt. In particular, the model explains why small, high-growth firms may prefer equity over debt, and provides new testable empirical predictions. We further establish that equity financing is relatively more attractive when the firm already has some debt in its capital structure and when the firm needs to raise larger amounts of capital. We finally find that equity-like securities, namely convertible debt and warrants, can be optimal when considering a security design problem under asymmetric information.

In the paper titled “Granularity of Corporate Debt: Theory and Tests”, co-authored with Jaewon Choi and Josef Zechner, we study to what extent firms spread out their bonds’ maturity dates across time, which we call “granularity” of corporate debt. In our model, a firm’s access to the bond market may be hindered temporarily, either because the capital market freezes or because the firm becomes exposed to large risks. Therefore, it can be advantageous to diversify the debt rollover across maturity dates. Using a large sample of corporate bond issuers during the 1991–2009 period, we find evidence that supports our model’s predictions in cross-sectional and time-series tests. In the cross-section, corporate debt is more granular for larger and more mature firms, for firms with better investment opportunities, with more tangible assets, with higher leverage ratios, with lower values of assets in place, and with lower levels of current cash flows. We find that during the recent financial crisis especially firms with valuable investment opportunities implemented more granular debt structures. In the time-series, we also document that firms manage granularity in that newly issued corporate bond maturities complement pre-existing bond maturity profiles.

Finally, in an ongoing research project titled “Macroeconomic Risk and Asset Sales”, co-authored with Marc Arnold and Tatjana Puhan, we examine the role of asset sales for corporate investment in an economy with macroeconomic regimes. Equity holders can finance investments by issuing equity or by selling assets. Compared to issuing new equity, selling assets increases leverage which transfers value from bondholders to equity holders. We explore the implications of this value transfer on equity holders endogenous investment and financing choice to generate and test several novel predictions: First, high leverage firms have a higher tendency to finance investments by selling assets than low leverage firms. Second, as leverage is larger during bad economic times, asset sales are a more important source of financing for equity holders during recession than during boom. Finally, firms with a relatively high payout from investment during recession rely more heavily on asset sales as a financing source because they tend to have a particularly large leverage when they invest.

**Boundaries of the Firm and Mergers and Acquisitions**

The article titled “Stock Returns in Mergers and Acquisitions” (Journal of Finance, 2008), co-authored with Erwan Morellec, proposes a real options framework to analyze the behavior of
stock returns in mergers and acquisitions. Two important contributions follow from our analysis. First, we provide a complete characterization of the dynamics of firm-level betas (i.e. exposure to market-wide/systematic risk) through the merger episode and show that the acquirer’s beta changes dramatically in the time period surrounding the acquisition. Notably, we demonstrate that depending on the relative risks of the bidding and the target firm before the takeover, the beta of the bidding firm might increase or decrease prior to the takeover. When the acquiring firm has a higher (lower) pre-announcement beta than its target firm, the risk of the option to enter the takeover deal is higher (lower) than the risk of the underlying assets. Our framework therefore predicts that we should observe a run-up (run-down) in the beta of the bidding firm prior to the takeover when the acquiring firm has a higher (lower) asset beta than its target. The second key insight of our analysis relates to the change in beta at the time of the takeover. By exercising their real options to merge, firms change the riskiness of their assets and in turn their betas and expected stock returns. We show that the sign of the change in beta at the time of the takeover depends on the relative risks of the bidding and target firms. Using a sample of 1,086 takeovers of publicly traded firms between 1985 and 2002 from the Securities Data Company’s (SDC) U.S. Mergers & Acquisitions database, we present new evidence on the dynamics of firm-level betas, which is strongly supportive of our model’s predictions.

The article titled “Liquidity Mergers” (Journal of Financial Economics, 2011), co-authored with Heitor Almeida and Murillo Campello, studies the interplay between corporate liquidity and asset reallocation opportunities. Our model shows that financially distressed firms are acquired by liquid firms in their industries even when there are no operational synergies associated with the merger. We call these transactions “liquidity mergers,” since their main purpose is to reallocate liquidity to firms that might be otherwise inefficiently terminated. We show that liquidity mergers are more likely to occur when industry-level asset specificity is high (i.e., industry-specific rents are high) and firm-level asset specificity is low (industry counterparts can efficiently operate distressed firms’ assets). We also provide a detailed analysis of firms’ liquidity policies as a function of real asset reallocation, examining the trade-offs between cash and lines of credit. The model makes a number of predictions that have not been examined in the literature. Using a large sample of mergers, we verify the model’s prediction that liquidity-driven acquisitions are more likely to occur in industries in which assets are industry-specific, but transferable across industry rival firms. We also verify the prediction that firms are more likely to use credit lines (relative to cash) when they operate in industries in which liquidity mergers are more frequent.

Continuing my interest in mergers and acquisitions, Jianjun Miao and I note that most takeover models tend to focus on firm characteristics to explain why firms should merge or restructure, but they are less successful at uncovering the relation between industry structure and takeovers. In our article titled “The Dynamics of Mergers and Acquisitions in Oligopolistic Industries (Journal of Economic Dynamics and Control, 2012), we therefore embed an oligopolistic industry structure in a real options framework in which synergy gains of horizontal mergers arise endogenously and vary stochastically over time. We find that mergers are more likely in more concentrated industries. Mergers are also more likely in industries that are more exposed to industry-wide shocks. Moreover, returns to merger and rival firms arising from restructuring are higher in more
concentrated industries. Perhaps surprisingly, increased industry competition delays the timing of mergers. In sufficiently concentrated industries, bidder competition induces a bid premium that declines with product market competition. Finally, we establish that mergers are more likely and yield larger returns in industries with higher dispersion in firm size.

In the paper titled “Capital Structure, Product Market Dynamics, and the Boundaries of the Firm”, co-authored with Rich Mathews and David Robinson, we study how interactions between financing and investment decisions can shape firm boundaries in dynamic product markets. In particular, we model a new product market opportunity as a growth option and ask whether it is best exploited by a large incumbent firm (Integration) or by a separate, specialized firm (Non-Integration). Starting from a standard theoretical framework, in which value-maximizing corporate investment and financing decisions are jointly determined, we show that Integration best protects the value of assets in place, while Non-Integration best protects the value of the growth option and maximizes financial flexibility. These forces drive different organizational equilibria depending on firm and product market characteristics. In particular, we show that increases in standard measures of cash flow risk predict exploitation of new opportunities by specialized firms, while increases in product market risk (i.e., the risk of preemption by competitors) predict exploitation by incumbents. We also show that alliances organized as licensing agreements or revenue sharing contracts sometimes better balance the different sources of value, and thus may dominate more traditional forms of organization. These key results arise from the dynamic interaction of the new opportunity’s option-like features with realistic competitive forces.

In the paper titled “Does the Dearth of Mergers Mean More Competition?”, Bart Taub and I study mergers in a duopoly with differentiated products and noisy observations of firms’ output choices. Firms select dynamically optimal actions that are not static best responses and merger incentives arise endogenously when firms sufficiently deviate from their collusive actions. The incentive to merge trades off the gains from avoiding price wars against the gains from a monopoly net of the fixed cost of merging. Depending on the merger cost, there are three merger outcomes: if the cost is low, firms merge immediately, if it is high, they never merge, and, in an intermediate cost range, there are endogenous mergers for which we derive a number of novel results. First, we characterize the firms’ shares in the merged firm as a function of firm and product market characteristics. Second, we show that long periods of pre-merger collusion are supported, because collusion is dynamically stable and merging is unstable, with mergers occurring only when collusion has failed, and hence the dearth of mergers need not mean more product market competition. Third, the acquiring firm’s pre-merger returns are first positive and then become negative just before the merger occurs, while the target firm’s returns follow the opposite pattern. Fourth, there are no announcement returns when industry concentration changes due to mergers.

**Intersection of Asset Pricing and Corporate Finance**

Researchers have established a negative relation between stock returns and dispersion of analysts’ earnings forecasts, arguing that asset prices reflect more the views of optimistic investors because of
short-sale constraints in equity markets. The article titled “Corporate Bond Credit Spreads and Forecast Dispersion” (Journal of Banking and Finance, 2010), co-authored with Levent Güntay, investigates if a similar effect prevails in corporate bond markets. After controlling for common bond-level, firm-level, and macroeconomic variables, we find evidence that bonds of firms with higher dispersion demand significantly higher credit spreads than otherwise similar bonds and that changes in dispersion reliably predict changes in credit spreads. This evidence suggests a limited role of short-sale constraints in our corporate bond data sets. Consistent with a rational explanation, dispersion appears to proxy largely for future cash flow uncertainty in corporate bond markets.

The article titled “Governance and Equity Prices: Does Transparency Matter?” (forthcoming in the Review of Finance), co-authored with Lifeng Gu, examines how accounting transparency and corporate governance interact. Firms with better governance are associated with higher abnormal returns, but even more so if they also have higher transparency. The effect is largely monotonic—it is small and insignificant for opaque firms and large and significant for transparent firms—and survives numerous robustness tests. We find supportive evidence for firm value and operating performance. Hence, governance and transparency are complements. This complementarity effect is consistent with the view that more transparent firms are more likely takeover targets, because acquirers can bid more effectively and identify synergies more precisely.

In the paper titled “Real Options and Risk Dynamics”, Timothy Johnson and I consider a firm with repeated investment and disinvestment options and find that systematic risk as function of profitability describes a characteristic concave-convex graph. The non-monotonic risk profile means that good news can either raise or lower expected returns, but the response is always more positive near the exercise of the firm’s real options. The model thus implies a U-shape function for return autocorrelations, which we find in the data. The model also implies that the average slope of a firm’s expected return function depends on the reversibility of its capital. Using empirical proxies for capital adjustment costs, we find support for this predicted interaction effect, implying non-trivial differences in contraction options across firms. The average firm’s risk profile slopes upward with profitability, which is inconsistent with irreversibility. Under reversibility, good news always raises expected returns. In this case, the model may help to explain the positive profitability effect in stock returns, as well as momentum and post-event drift.

Finally, “Financial Risk, Stock Returns, and the 1978 Bankruptcy Reform Act”, co-authored with Rainer Haselmann and David Schoenherr, studies the effect of weakening creditor rights on stock returns via a major bankruptcy reform that shifted bargaining power in distressed firms in favor of shareholders. The reform significantly reduces portfolio- and firm-level distress premia of distressed stocks. The decline in distress premia is smaller for firms with higher and with more substitutable firm-level proxies of shareholder bargaining power, which suggests a differential effect of the reform-based increase in shareholder bargaining power on stock returns. Higher corporate bond yield spreads, lower stock returns of firms with deviations from absolute priority, and higher return continuation of distressed stocks provide supporting evidence. Thus, we document an important channel of how creditor rights affect the costs of external funding; while weaker creditor rights are associated with higher bond yields, they can lead to lower equity premia.
List of Published Works Citing my Articles

This list reflects my current knowledge. The sources are the Web of Knowledge, Scopus, RePEc, and Google Scholar. It is arranged by my articles and then alphabetically by the first author’s last name and by date. My research appears 247 times in the reference sections of published works.

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